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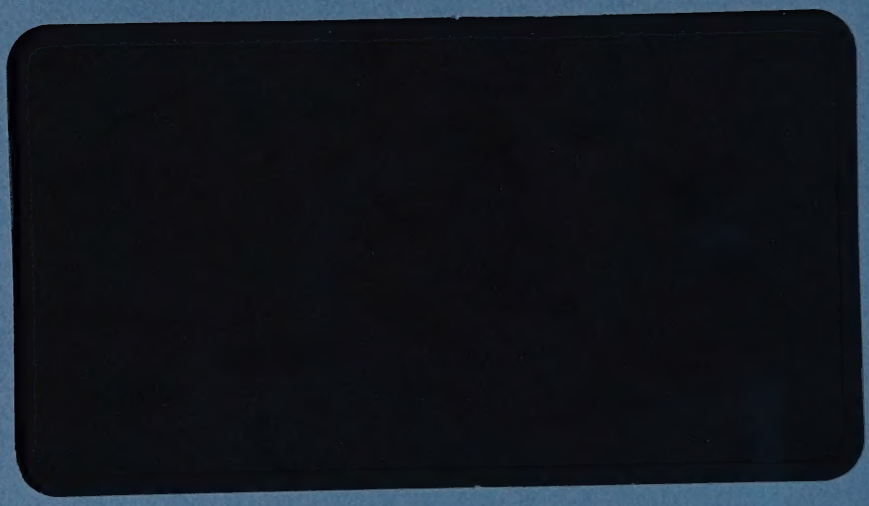

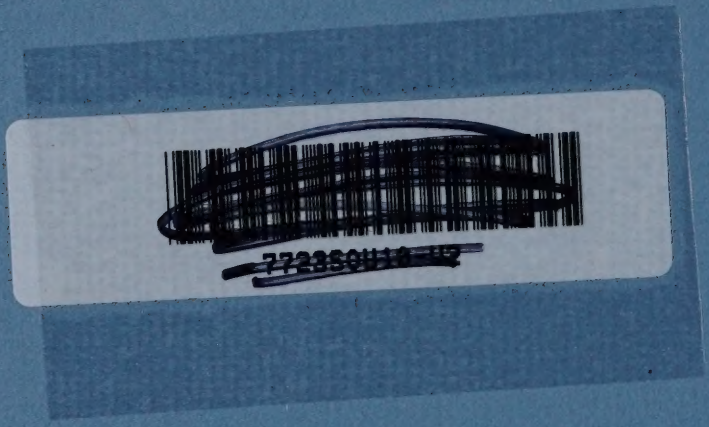

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May 1978

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APPENDIX A

ADDENDUM TO GLOSSARY

ADDENDUM TO GLOSSARY

ABSORPTION (Visibility). Removal of light and conversion to another form of energy such as heat.

ABSORPTION (Scattering) Coefficient. Ratio of decrease in luminance per unit length of atmosphere to incident luminance (units: km^{-1}).

AEROSOL. Gaseous suspension of fine particles, solid or liquid.

ANTHROPOGENIC SOURCES. Those associated with man's activities.

APPARENT (luminance, contrast). Observed property of object, including effect of intervening atmosphere.

COMPLEX INDEX OF REFRACTION. Complex number determining the absorption and scattering properties of a substance.

CONTRAST. Ratio of the difference between the luminance of an object and its background to the luminance of the background (for example, the luminance of a truly black object is -1).

DUST. An aerosol made of solid particles derived from breaking up of larger solids. (Fugitive dust is airborne by the action of the wind.)

EFFICIENCY FACTOR (MIE). The ratio of the total cross section for absorption and scattering of light by a particle to the cross sectional area.

EXTINCTION. The removal of light by absorption and scattering.

GEOMETRIC STANDARD DEVIATION. The measure of dispersion for a log-normal distribution, the ratio of the 84.13 percentile to the 50th percentile.

INTENSITY. Energy per unit time per unit solid angle (burner/stearadian).

INTRINSIC (luminance, contrast). Observed property of object without effect of intervening atmosphere.

LUMINANCE. Intensity in a given direction per unit of projected area (lumen/m^2-stearadian).

MEDIAN (Geometric mean). The 50th percentile demarkation for a distribution.

NUMBER SIZE DISTRIBUTION. The frequency of occurrence of particles of various sizes in sample.

PARTICULATE. Solid substances defined to distinguish them from liquid droplets (when there is no need to differentiate between the particle and droplet components of an aerosol, the collective term particulate is used).

PHOTOPIC VISION. Vision acclimated to bright daylight.

SCATTERING. Removal of light and redirection in the form of light.

SUSPENDED PARTICULATES (SP). Model-predicted pollutant concentrations attributable to mine impact alone - may be compared with PSD regulations.

THRESHOLD OF CONTRAST PERCEPTION. The value of contrast that permits an object to be just barely seen.

TOTAL SUSPENDED PARTICULATES (TSP). The combination of model-predicted pollutant concentrations attributable to mine impact alone with projected background concentrations to determine cumulative impacts - may be compared with federal and Wyoming ambient air quality standards.

VISIBLE LIGHT. Electromagnetic radiation with characteristic wavelength between about 4500Å and 7200Å (1Å = 10^{-8} cm), which is capable of causing a visual sensation directly.

APPENDIX B

DOCUMENTATION

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Jim Wilson, Black Butte, Point of Rocks, WY, 6 February 1978

Requested more information on mine specifics. Black Butte overburden dumps have no load-in or load-out. These dumps are leveled by bulldozers. The number of hours of bulldozer operation can be used to calculate excess fugitive dust from the dumps. Black Butte has five D-9 tractors, which follow the dragline, truck/shovel, and scraper operations. The vehicles are in operation seven hours per shift, 50 weeks per year. The two draglines plus two D-9s, the two truck/shovel rigs, plus two D-9s, and the scraper plus one D-9 operate 20, 15, and 10 shifts per week, respectively. The two dozers at the Twin Creek and South Haystack overburden dumps are associated with the truck/shovel only and are in operation 10 shifts per week. These dumps do have a load-in and load-out procedure.

Wilson described the dumping plan for South Haystack. He suggested contacting Gene Frank of Rocky Mountain Energy, Denver, for information on Twin Creek overburden dumps. For all three mines as well as North Block, lowland access road repair will be accomplished by two patrols, each working 10 shifts per week, seven hours per shift, 50 weeks per year.

Tate Johnson, Rocky Mountain Energy, Sheridan, WY

Requested information on Twin Creek overburden data. Twin Creek has seven pits and two permanent overburden dumps. Between 1980 and 1983, 42 mm yd^3 bank will have been placed in these permanent dumps. Up through 1985 they will have backfilled 10 mm yd^3 from pit to pit. The swell settlement factor here is 1.15. Johnson relayed the overburden load-in and load-out schedule for the Twin Creek mine. To grade these dumps, dozers will operate 30 shifts per week for 48 weeks per year. Overburden removal varies from mine to mine so at some mines load-out from dumps to pits may begin before mining operations end. Johnson thinks that North Black will be a mixed dragline and truck/shovel operation.

Jack Norman, BLM, Rock Springs, WY, 6 February 1978

ERT called to request information on wind erodible acres at Long Canyon, Winton, and Reliance Mines. Norman said Long Canyon is sandy, loam-type soil. He said a maximum of 100 to 150 acres will be exposed at Long Canyon Mine in any given year. The 15 acres per year figure reported in the draft ES refers to an average spread out over the mine life. At Winton and Reliance Mines, Norman said 80 acres will be exposed in any year. The 2 acres per year figure reported in the draft ES refers to an average.

Wayne Christian, Sun Energy Development Co., Dallas, TX, 3 February 1978

ERT called with some questions on Long Canyon. Christian said coal storage would be open (uncovered) because coal will be shipped within a very short time. Dust control equipment will include baghouses and spraying at transfer points. The only crushing will be primary.

Brent Walquist, Rocky Mountain Energy, Denver, CO, 3 February 1978

Walquist provided information on the distance to haul road at Twin Creek Mine (4 miles for the first eight to nine years, 6 miles for remainder of mine life). He was not able to provide information on the percentage of overburden stored temporarily, but said he would check with Jim Wilson over the weekend.

Kenneth Neuschwander, Utah Power & Light, 6 January 1978

ERT called to request air quality data for Naughton Power Plant. Neuschwander suggested ERT obtain air quality data for Naughton's three operational units from Wyoming DEQ. He supplied estimates of the following operating parameters for proposed Units 4 and 5: heat rate, Mw rating, stack height, stack diameter, T_E, flue gas rate, control efficiency, heat content, sulfur content, ash (%), SO_2, TSP, and NO_x.

Fran Eickbush, BLM, Rock Springs, WY, 5 January 1978

ERT called to request the latest revised data on the five proposed mines, two projected mines, seven preference right lease mines, and one competitive coal lease mine. Eickbush sent a big land status map with all fifteen mines depicted and data on these mines. He said Reliance and Winton Mines will be underground mines, and the competitive coal lease mine is part of the existing South Block Mine, which will disturb 40 acres over eight years. Eickbush suggested comparing data he supplied for Black Butte Mine to that in ERT report. He could not provide data on Jim Bridger and Naughton Power Plants.

Paul Kimberling, BLM, 6 January 1978

ERT called to request socioeconomic data. Kimberling said that he could not provide it as all socioeconomic data input requirements should be coordinated through Eickbush.

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Fran Eickbush, BLM, 6 January 1978

ERT requested the following socioeconomic data, and Eickbush sent it all one week later when it became available.

- Population projections through 1990 (including residential increase)
- Transportation data and projections
- Employment projections
- Agricultural activity data by county
- New construction

Ted Phillips, Pacific Power & Light, 6 January 1978

ERT called to request emissions data for Jim Bridger Power Plant. Phillips said it would take him one to two weeks to collect and forward these data. The same data were submitted to and may be available from the State of Wyoming DEQ.

Tom Lukow, BLM COAR, 6 January 1978

ERT called to request emissions parameters for power plants. Lukow suggested contacting the Wyoming DEQ or Naughton and Jim Bridger Power Plants directly. He could not supply these data.

Woody Russell, Wyoming DEQ, 6 January 1978

ERT called to request all stack and emissions parameters available for the Naughton and Jim Bridger Power Plants. He suggested calling Frank Davis of Utah Power & Light for information on the two proposed units at Naughton and relayed all requested data for the operational units.

Fran Eickbush, BLM, 9 January 1978

ERT called to request information on mining. Eickbush provided information on the annual rates of acreage disturbance and coal mining for open pit mines and strip mines. He described the variable frequency of blasting and suggested contacting the Jim Bridger Mine, Kemmerer Mine, and the 13 December 1977 Federal Register for more information on blasting regulations. Eickbush said that coal volatility was low to medium for surface mines and higher for underground mines.

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Dan Kringel, ERT-WTC, Westlake, CA, 9 January 1978

ERT called to request raw data on Black Butte Mine emissions. Kringel said the data came from Wyoming DEQ and would be sent to us via Federal Express. Other data on mines throughout the Central Rockies may also be available from DEQ. Kringel described a controversy involving independent modeling by ERT and Wyoming DEQ of Black Butte emissions (cited errors in DEQ's work). At present, Wyoming DEQ has a high opinion of ERT.

Fran Eickbush, BLM, 10 January 1978

ERT called to request updated information on Black Butte mine and to clarify maps that he sent us. Eickbush does not feel ERT needs to contact DEQ for any mining information. He is sending us data from DEQ for Twin Creek, South Haystack, and Black Butte Mines (with changed configuration) as well as data from Long Canyon and North Block that DEQ does not have. On the maps he sent, proposed mine boundaries are outlined, the general areas of preference right lease mines (PRLs) are indicated, and existing mines are not pictured. Eickbush still had not sent data on alternatives to PRLs.

Fran Eickbush, BLM, 11 January 1978

Conference call to check locations of projected and PRL mines. Eickbush said he would verify locations of the projected mines, PRL mines, and the two power plants. Winton and Reliance Mines are old, existing mines that will possibly be reopened. Eickbush had not yet sent data on PRL alternatives and said it would be very vague. The combined acreage for PRL areas 9, 10, and 11 will be approximately 2,600 acres of public lands and 5,200 acres to comprise a logical mine unit.

Fran Eickbush, BLM, 11 January 1978

Conference call to clarify data in Chapter 1 of the draft ES received this morning. Eickbush promised to check on some information and answered other questions directly. (1) He said no information is available on North Block Mine from Wyoming DEQ - the only available information is North Block's own EIS and permit. (2) He said that no data were sent on length of roads at Twin Creek Mine because mining activity there will be intense, and haul roads will be continually consumed. (3) No update will be made on data for existing mines. They are on private lands mostly and don't have to satisfy federal regulations. P2801 data on existing mines is the most up-to-date. (4) Eickbush clarified the mine type for Twin Creek, North Block, Black Butte, and South Haystack Mines. (5) Tables of disturbed acreage include support and mined lands. (6) Assume that no contour mining will be conducted.

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Fran Eickbush, BLM, 12 January 1978

ERT called to get exact mine locations. Eickbush gave exact positions of the following mines by U.S. Public Land Survey rectangular system coordinates (township and range coordinates in relation to a principal meridian): Reliance, Winton, Stansbury, competitive coal lease mine adjacent to the existing South Block Mine, and Naughton and Bridger Power Plants. Preference right lease mines will be represented by a circle about the mining acreage.

Fran Eickbush, BLM, 13 January 1978

ERT called with several questions. Eickbush answered them all. (1) Assume no haul roads to Reliance and Winton Mines: Reliance and Stansbury Mines use strictly rail conveyance, and Eickbush expects a rail spur to be built to Winton. (2) Eickbush explained map notation for Reliance and Winton sent to ERT. (3) Eickbush said Wyoming has dust control regulations, and control must be applied in all instances where "standards for fugitive dust emissions are exceeded. ERT should assume silo storage, covered conveyors, and haul road watering for all surface mines; watering only for North Block Mine.

Dan Kringel, ERT-WTC, 13 January 1978

ERT called to clarify items pertaining to Ann Berman's Black Butte study. Kringel provided information on silt content assumptions in P2801 (30%) and those accepted by Wyoming DEQ (12%). He recommends contacting DEQ and computing total burden from both estimates. Kringel also gave an approximate speed of 15 mph for haul trucks.

Fran Eickbush, BLM, 16 January 1978

ERT called to ask about Preference Right Lease (PRL) application mines. Eickbush said not to be specific about these but to refer to them only as areas of interest to industry that may be developed. ERT is not to identify them as PRLAs. On maps they should be designated with a circle and labeled "an area that may be mined." Of the PRLAs adjacent to Long Canyon, only the one to the north of the mine should be considered.

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Fran Eickbush, BLM, 16 January 1978

Inquired as to how to determine haulage distance from the maps. For all surface mines, including North Block, haul roads will most likely be constructed across backfilled areas. ERT should use this information to estimate the road lengths for all mines except Black Butte as DEQ has already calculated the length for this site. ERT requested an estimate of the percentage of total overburden to be stored in the dump. Eickbush will get back on this. ERT asked about the percent of recoverable reserves versus total coal mined. BLM assumes a 90% recovery for surface mines, 50% for underground mines, and 80 to 85% for Long Canyon Mine if a long wall is used. When asked about the discrepancies between information in the regional and site-specific descriptions in Chapter 1, Eickbush replied that Long Canyon mine life is 40, not 35, years; South Haystack coal production in 1980 will be 1.5 mm tons, not 2.5 to 3.5 mm tons; and North Block mine production will be 1.4 mm tons per year for 35 years.

Fran Eickbush/Jack Norman, BLM, 16 January 1978

ERT requested a description of the areas adjacent to the mine sites. Soil cover surrounding Black Butte Mine is sandy loam. All other surface mines are in areas of clay loam with a rocky cover. Rolling terrain is in the vicinity of the sites. Norman will get back to ERT on the breakdown of overburden dumped versus overburden used to backfill previous pits.

Jack Norman, BLM, 17 January 1978

BLM's best estimate of the percent of overburden stored is 20 to 30% at Black Butte, 10 to 30% at North Block, 40 to 60% at South Haystack, and 50 to 60% at Twin Creek. The topography around each respective mine is irregular with isolated cliffs; flat; irregular with isolated cliffs; and flat or rolling. Reclaimed areas usually require two to three years to acquire full vegetative cover.

Jack Norman, BLM, 17 January 1978

ERT requested more information on reclamation schedules and overburden haulage. "Areas reclaimed" refer to land where reclamation has begun even if it has not been completed. All overburden dumps will be leveled and graded eventually. ERT should assume a factor of 4 for one-way average haulage distance in each analysis year.

Fran Eickbush/Jack Norman, BLM, 19 January 1978

ERT should assume that there will be no secondary crushing at any of the underground mines. The employee access roads for Reliance and Winton Mines are those shown on the RME map. Eickbush thinks they will be upgraded with scoria but not paved. When asked about the long-term storage of overburden, he suggested contacting Tate Johnson or Jack Reed of the Cumberland Coal Company, Omaha, NB.

Fran Eickbush, BLM, 24 January 1978

Requested information on noncoal mining in southwestern Wyoming. The most significant increase in trona mining activity is expected between 1975 and 1980, then it should begin to level off. The single phosphate mine in the region is scheduled to shut down by 1980. Reclamation at this site has already begun. No other significant mining activity is presently occurring.

Rick Defieux, ERT (on assignment at ECI, Fort Collins, CO), 25 January 1978

ERT requested information on trona mining properties and procedures. After speaking with the ECI staff, Rick reported that the FMC trona mine is an old one that uses old equipment and has a severe particulate problem. Trona mining is all underground so that emissions come mainly from storage and tailing piles. The fines are recovered and used; the nonfines (bulk of the storage) are waste. Ore starts 800 to 1,600 feet down. Processing of the trona is a wet operation; the substance absorbs moisture easily and tends to aggregate. Defieux had no information on whether or not the crushing/screening operation is enclosed or what percent of the total storage is waste or tailings piles.

Roberta Lewis, ERT-WTC, 30 January 1978

ERT called to discuss the difference between emissions used in the Black Butte study performed by ERT-WTC (DEQ) and the recently derived results. The major issues covered were the haul road silt content, wind erosion, and emission burdens. Topsoil silt content is not the proper index as topsoil is most often removed from haul road areas and replaced with a material of lower silt content. ERT should learn from the mines if any silting has been done on this material. Regarding wind erosion, the present study calculates the erosion factor based on the difference between accumulated acres disturbed and accumulated acres reclaimed for the exposed surface area. The DEQ emission values, however, were based on acres disturbed. Both analyses included partially reclaimed land. The present study applies vegetative adjustment factors of 0.9, 0.8, and 0.7 to acres reclaimed in year-1, year-2, and year-3. DEQ applied

an overall vegetative factor of 0.8 to the sum of acreage disturbed in year-0, year-1, and year-2. The major difference arises from the larger exposed acreage obtained in the present study. No concensus was reached on which method is most suitable. All emission analyses used by DEQ in checking the initial CDM runs with ERTAQ were performed by DEQ.

Don Hadley/Ted Phillips, Pacific Power & Light, 5 January 1978

Inquired about the availability of 1975, 1976 air quality data collected at the Jim Bridger Power Plant. Ted Phillips gave his permission to use the data in our report. Don Hadley is compiling the SO_2, TSP, and NO_2 data for five sites and the met data from the roof and tower and will forward it immediately.

Gerald Blackwell, Wyoming DEQ, 9 January 1978

Requested information on four TSP monitors that could explain the significant difference in 1975 and 1976 TSP data. Blackwell made some suggestions that would explain the variation, including movement of one hi-vol sampler and increased traffic and construction in the immediate vicinity of the monitor. When asked for SO_2 data from the Naughton monitors K-1 through K-4, Blackwell replied that Utah Power & Light had been uncooperative in providing data; and, therefore, the DEQ did not have any. DEQ also sent all 1976 TSP and SO_2 data for Texas Gulf and FMC samplers to EPA. No one at DEQ knows to whom it was sent. They have no more copies.

John Schaefer, ECI, 9 January 1978

Requested information on any proposed point sources, such as mines, in Uinta, Lincoln, Sweetwater, or Carbon counties. Schaefer said that FMC is expanding trona mine No. 10 north of Little America. It will probably be in operation by the end of the year. He also provided the 1976 data for the South Haystack monitor.

Dave Lewis, Surveillance and Analysis Division, EPA, Denver, CO, 9 January 1978

Requested the 1976 TSP and SO_2 data for Texas Gulf and FMC monitors that the Wyoming DEQ sent to EPA. Dave Lewis was able to find this information and is sending it immediately. FMC site A and Texas Gulf No. 1 have inadequate or no SO_2 data, so he is sending SO_2 data for all other monitors in the area. This will be a listing of maximum 24-hour

concentrations and annual means. If we want the raw data, we have to apply for it through the Freedom of Information Act, which is time consuming and expensive.

Chuck Raffelson, Wyoming DEQ, 6 January 1978

Asked about the compliance with air quality standards of the counties in southwestern Wyoming. According to Raffelson, Uinta, Lincoln, and Carbon Counties are in compliance for all pollutants. Sweetwater County has two areas, the trona patch and Rock Springs, that are not in compliance and that have been isolated for particulate violations. He suggested we call Chuck Collins of Wyoming DEQ to find out the status of the state Air Quality Maintenance Plan. Raffelson was not aware of any areas in the state, including the Wind River Indian Reservation, that have been reclassified; all of it is still Class II.

Chuck Collins, Wyoming DEQ, 9 January 1978

EPA has the Wyoming Air Quality Maintenance Plan but as yet has made no comments. In addition to the trona patch and Rock Springs, the City of Evanston may also be a nonattainment area for particulates. No Class II or III areas have been redesignated to Class I. After 1 March 1978, however, the Wyoming DEQ may consider reclassifying some areas.

U.S. Forest Service, Ashley National Forest, Vernal, UT, 12 January 1978

The High Uinta Primitive area located in Ashley National Forest has been proposed as a wilderness area since 1967, but the Congressional committee has yet to reach a decision. Chances are slim that they will reach one in the near future. If it was given wilderness status, it would become a Class I area.

Tim Connor, U.S. Forest Service, Bridger National Forest, WY, 12 January 1978

Requested information on Wyoming Wilderness areas. Connor described the five and gave their approximate locations: Bridger, North Absaroka, Washakie, Fitzpatrick, and Teton. He also mentioned the proposed Popoagie Wilderness Area, which borders the Bridger Wilderness Area. This proposal has been in Congress since 1974 and has a good chance of being approved.

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Tom Lukow, BLM, 14 January 1978

Discussed meeting scheduled for 24 January with the BLM and the proposed modeling project for Naughton Power Plant proposed Units 4 and 5. ERT requested a definition for "end of mine life." Lukow agreed with ERT's interpretation but will check with Tom Loomis to see if this is what he expects. Loomis apparently believes the end of mine life to mean when the land is turned over for new uses and not when mining operations are halted. ERT informed Lukow that the site-specific section would include an analysis of the worst-case year only; however, the region would still include analysis of the years 1980, 1985, and 1990. He suggested document 1791 as a guideline for Chapters 3, 4, and 8. Loomis also defined Energy Minerals Activities Recommendation System (EMARS).

Mr. Geslin, North Block Project Engineer, Kemmerer Coal Company, 1 February 1978

Requested more information on the operations at the North Block Mine. Plans are still in the formative stage because of the uncertainty that the new power plant will be built. Presently North Block plans call for a truck and shovel operation. The haul road to the power plant will be 6 miles long, the haul road to the crusher will be 0.5 miles; both will be covered with gravel or scoria (12% silt). Vehicle speed over these roads will be limited to 25 mph at the maximum. Each truck will have a 100 ton capacity. The access road to the mine will be 4.5 miles one way and is also covered with gravel. Overburden will be stored according to Law 211. Transfer, conveying, and storage operations will conform with state regulations (closed conveyors and spraying water at the crushers). The acreage disturbed for the first two years will not be reclaimed until the end of mine life. This should be added to the disturbed acreage in the reclamation schedule.

Brent Walquist/Eugene Frank, Rocky Mountain Energy Corporation, 2 February 1978

Requested information on Reliance and Winton Mines and Twin Creek Mine trucks. New Wyoming regulations require dust supressants so at Reliance and Winton dust collectors will be placed at transfer points, feeders, and crushers. Baghouses should provide 98% control. In some instances, oil spray will be used to load-out facilities. Each mine will have a minimum of six transfer points. When asked about employee access roads (EAR), Walquist said that he expects the mine employees to use the same gravel road currently used by Stansbury employees. It runs along the east side of the Union Pacific Railroad. Bituminous binder will be disked into the roads so ERT should assume 90% control. EAR distances from the county road will be 3.7 miles and 2.0 miles for Winton and Reliance, respectively. Carpooling is a common practice at Stansbury, so Frank feels that three people per car would be a reasonable

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estimate to use for traffic calculations at the two proposed mines. The truck capacities at Twin Creek are not yet definite; however, the lower estimates are already incorporated into the BLM's plan so ERT should use those: 120 tons overburden, 50 to 80 tons coal.

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APPENDIX C

REFERENCES

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